CLAIMS

1. An electrical machine comprising:

a magnetically permeable ring-shaped core centered on an axis of rotation and having two axially-opposite sides;

coils wound toroidally about the core and disposed sequentially along a circumferential direction of the core, each coil including two side legs extending radially alongside respective sides of the core;

coil-free spaces between adjacent side legs; and

a bracket having first and second side flanges that are connected by a bridging structure and respectively abut the first and second sides of the coil.

2. The machine of claim 1 wherein the first side flange is configured to provide a flat side surface defined by the first side flange and the side legs adjacent the first side flange.

3. The machine of claim 1 wherein the first side flange has a thickness approximately equal to a bundle thickness of the side legs adjacent the first side flange.

4. The machine of claim 1 wherein the first side flange comprises plastic.

5. The machine of claim 1 wherein the first side flange comprises magnetically-permeable material.

6. The machine of claim 5 wherein the magnetically-permeable material is iron-based.

7. The machine of claim 1 wherein the first side flange fills a coil-free space along a side of the core.

8. The machine of claim 1 wherein the bracket is configured to mount the core in place.

9. The machine of claim 1 comprising one such bracket installed about each coil-free space along the first side of the core to provide a flat peripheral surface defined by the side flanges of the brackets and the coils.

10. The machine of claim 1 wherein the second side flange of the bracket is like the first side flange.

11. The machine of claim 1 further comprising a permanent magnet, rotatable relative to the core, having a surface that is adjacent and facing one of the side surfaces of the core.

12. The machine of claim 1 wherein the bridging structure is a flange filling the space between adjacent radially-outer legs of the coils and having a thickness approximately equal to a bundle thickness of the adjacent radially-outer legs.

13. An electrical machine comprising:

a magnetically permeable core that is elongated to thereby define a lengthwise direction and a profile that is transverse to the lengthwise direction;

coils wound about the core profile and sequentially disposed along the lengthwise direction; and

a magnet adjacent to the core and movable relative to the core;

the core including fragmented magnetically permeable material.

14. The machine of claim 13 wherein the magnet comprises a multi-pole permanent magnet having a surface that is adjacent and facing one of the side surfaces of the core;

15. The machine of claim 14 wherein the magnetically permeable material is fragmented in that it is in the form of a bundle of lengthwise-extending wire.

16. The machine of claim 14 wherein the magnetically permeable material is fragmented in that it is in the form of powder.

17. The machine of claim 14 wherein the core includes a first section comprising the fragmented magnetically permeable material and a second section, underlying the first section, comprising a stack of magnetically permeable tape.

18. The machine of claim 17 wherein the core is ring-shaped and centered on an axis of rotation, such that the lengthwise direction is a circumferential direction, the first section is ring-shaped, and the second section is ring-shaped and located about the first section, and wherein the first section comprises turns of iron-based wire, and the second section comprises spirally wound iron-based tape.

19 An electrical machine comprising:

first and second magnetically permeable parallel cores, each core being elongated to thereby define a lengthwise direction and first and second core profiles transverse to the lengthwise direction;

first coils wound about the first core profile and sequentially disposed along the length of the first core;

second coils wound about the second core profile and sequentially disposed along the length of the second core; and

a multi-pole elongated permanent magnet parallel with both cores and located between them, the magnet being movable, relative to the cores, in the lengthwise direction.

20. The machine of claim 19 wherein the lengthwise direction extends about an axis of rotation such that the elongated cores are ring-shaped and centered on the axis and the coils are toroidally wound about the cores and sequentially disposed about the axis.

21. The machine of claim 19 further comprising a second multi-pole elongated permanent magnet that is parallel with the first magnet, configured to move in unison with the first magnet, and located at the opposite side of the second core as the first magnet.

22. An electrical machine comprising:

a magnetically permeable ring-shaped core centered on an axis of rotation;

coils wound toroidally about the core and sequentially disposed along a circumferential direction of the core; and

a multi-pole ring-shaped permanent magnet centered on the axis;

the core and the magnet being disposed one about the other.

23. The machine of claim 22 wherein the magnet is disposed about the core.

24. An method comprising:

providing a ring-shaped permanent magnet centered on an axis and having radially inner and outer surfaces and opposite first and second side surfaces;

overmolding a casing material about the magnet to yield a magnet assembly, the casing material located along the radially inner and outer surfaces and the first side surface;

determining a boring location for the particular assembly by performing a balance test on the assembly;

boring an axially-extending hole in the blank at the boring location; and

securing a rotor shaft in the hole.

25. The method of claim 24 wherein the determining step comprises determining both the boring location and a boring angle for the particular assembly by performing the balance test on the assembly, and the boring step includes boring the hole at the boring location at the boring angle.

26. A method comprising:

providing a ring-shaped permanent magnet having radially inner and outer surfaces and opposite first and second side surfaces;

overmolding a casing material about the magnet to yield a magnet assembly, the casing material comprising a material that shrinks as it cools from a molten state, located along the radially and outer surfaces and the first side surface; and

mounting the assembly about a rotor shaft.

27. The method of claim 26 wherein the casing material comprises zinc or a material that shrinks as it cools from a molten state at least as much as zinc does.